

W.e.f 20AH Batch

OBJECTIVES: To enable the students to –

- Gain the realistic analysis of soil and its pollution
- Comprehensive skill in evaluating the soil health management and soil reclamation
- Get the acquaintance on water and its purification
- Be skilful on water parameter analysis
- Adopt the skill on soil and water samples

I. Learning outcomes:

1. Properties of soil and soil pollution.
2. Soil health and management of problematic soils and reclamation.
3. Properties of water and purification of water.
4. Water Quality Parameters and Deterioration
5. Analysis of soil and water samples

UNIT-I: Study of Soil

1. The structure of earth, Elemental composition of earth crust, Nature and classification of soil, important soil forming minerals, soil as eco system.
2. Soil fertility and productivity.
3. Properties of soil – Colour, temperature, pH, electrical conductance (EC), water holding capacity, organic carbon, soil salinity, soil density.
4. Soil pollution - Definition of soil pollution, types of soil pollutants, sources of soil pollutants, - their CPC standards and effect on plants, animals and human beings.
5. Sewage and industrial effluents – their composition and effect on soil properties/health, and plant growth and human beings; soil as sink for waste disposal.

UNIT – II: Chemistry of Soil

1. Soil health - Concept of nutrients, Micro and macro nutrients and its relation to Plant health and productivity.
2. Soil moisture - Maximum water holding capacity, field capacity, wetting point, available water capacity, soil water movement under saturated and unsaturated condition.
3. Problematic soils- Types of problematic soils.
4. Classification, Management of problematic soils and reclamation of problematic soils, saline soils -Alkaline soils, acid soils and water-logged soils.

UNIT – III: Study of water

1. Introduction: Water and its Quality Parameters.
2. Chemistry of water.
3. Water resources – Hydrological cycle.
4. Water quality parameters and drinking standard – Physical, Chemical quality of drinking water.
5. Biological quality of drinking water.

UNIT – IV: Water quality Deterioration

1. Natural Pollutants-Man-made Pollutants.
2. Municipal wastes Industrial wastes, Agricultural wastes.
3. Pollution in relation to water use.
4. Various water borne diseases.
5. Water quality standards.Microbiology of drinking water.
6. Ecological classification of waters.
7. Biological factors of water self-purification.

UNIT V: Analysis of soil and water samples

1. Analysis of soil samples for N, P, K, Ca, Mg, S, Zn, Cu, Fe, Mn, B and Mo;
2. Determination of lime and gypsum requirement of soil.
3. Analysis of soil extracts and irrigation waters for their soluble cations and anions.
4. Water Analysis – Water composition analysis – Hardness testing – pH- Salinity- Turbidity – TDS – Conductivity testing – Minerals – BOD, COD, DO, Coli forms – Culture identification – MPN test.
5. Microscopy: principles and practices – Staining methods.
6. Water borne pathogen: Types and Detection – Potability of water.
7. Agencies of water quality testing- – Pollution Control Boards (State and Central) – Duties and responsibilities – Water testing labs- Environmental lawconcepts.

REFERENCES

1. Laboratory Manual of Water and Wastewater Analysis, D.R. Khanna, R. Bhutiani, Daya Publishing House, Delhi, 2008
2. Chemical and Biological Methods for Water Pollution Studies, R.K. Trivedy, P.K.Goel, Oriental Printing Press, Aligarh, 1986
3. Practical Methods in Ecology and Environmental Science, R.K.Trivedy, P.K.Goel, C.L.Trishal, Environmental Publications,Karad (India) 1987
4. Analytical Chemistry-Alka Gupta (PragatiPrakashan)
5. Soil chemicals Analysis - P.R. Hesse
6. Soil testing manual by department of agriculture and cooperation, India

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